Unit 5

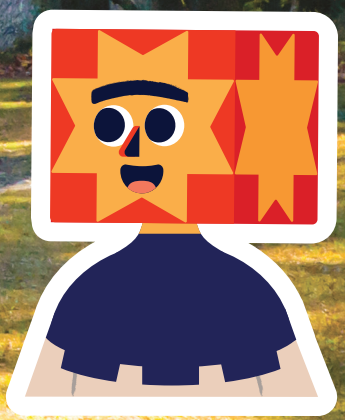
Fractions as Numbers

Essential Questions

- What does a fraction represent?
- How can the same number be represented in multiple ways?
- How do you know whether a fraction is greater than, less than, or equal to another fraction?

Unit Story: Coen and Obita

You can read the Unit Story with your student by visiting the Unit Story page on the Caregiver Hub.



Unit Investigation

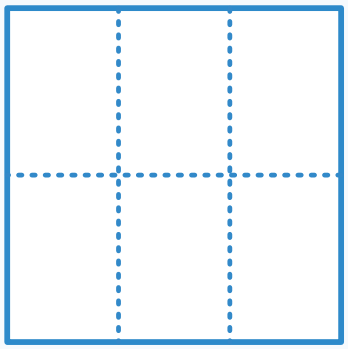
Lesson 1 is the Unit Investigation. Students create and describe whole composite shapes and their parts to build curiosity and apply their own knowledge in a variety of ways. Use the **Caregiver Connection** to help students continue to explore the math they will see in the unit.

Caregiver Connection

Students may enjoy identifying objects that are made up of different equal parts, counting the number of parts, and naming each part. For example, a window can have 4 equal-sized glass panes. Each window pane is one fourth of the whole window.

Summary | Lesson 2

You can name equal parts of a whole with words such as *fourths*, **sixths**, and **eighths**. You can also describe equal parts of a whole with a number called a **fraction**.



- 6 equal parts
- 6 sixths in the whole
- Each part is one sixth or $\frac{1}{6}$.

Try This

For Problems 1 and 2, the rectangle represents 1 whole. Partition the rectangle into the given type of equal parts.

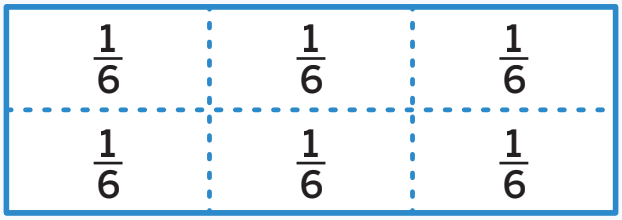
Draw

1 fourths

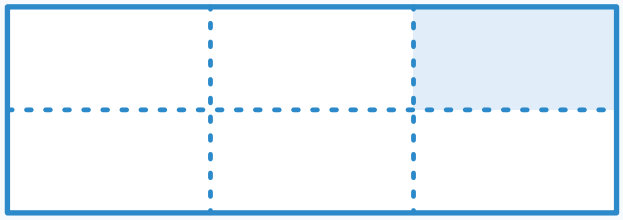
2 eighths

Summary | Lesson 3

Whether you describe each equal part of a whole or 1 equal part that is shaded, you can describe it with a **unit fraction**.



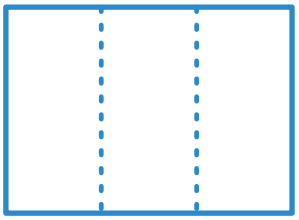
sixths



one sixth or $\frac{1}{6}$

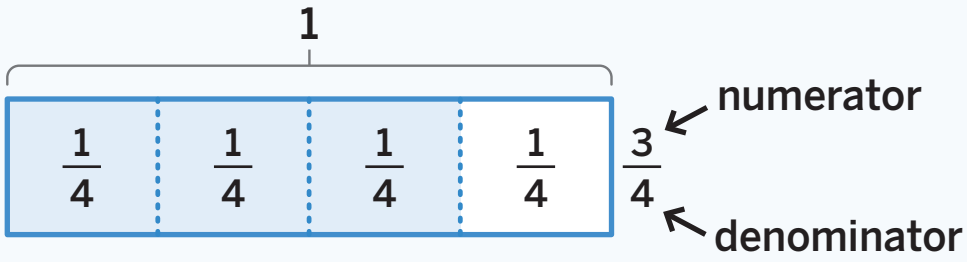
Try This

1 The large rectangle represents 1 whole. What fraction represents the value of each of the equal parts? Explain your thinking.



Summary | Lesson 4

The **numerator**, or top number in a fraction, tells the number of equal parts being described. The **denominator**, or bottom number in a fraction, tells the number of equal parts in 1 whole.



Try This

1 Each fraction strip represents a value of 1.

Diego says the fraction $\frac{10}{6}$ represents the fraction diagram

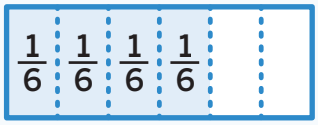
Jada says the fraction $\frac{10}{12}$ represents the fraction diagram

Who is correct? Explain your thinking.

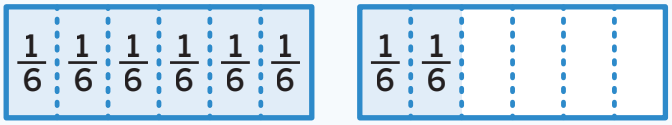
Summary | Lesson 5

When representing a fraction, you can consider the relationship between the numerator and denominator to determine whether the fraction is less than or greater than 1 whole.

$\frac{4}{6}$



$\frac{8}{6}$

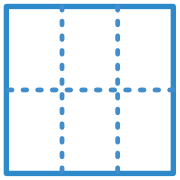


Try This

1 Jada is walking from the Statue of Liberty to a ferry boat. She walks $\frac{3}{4}$ of the way and stops to take a picture. Represent how far Jada has walked on the diagram. Explain your thinking.

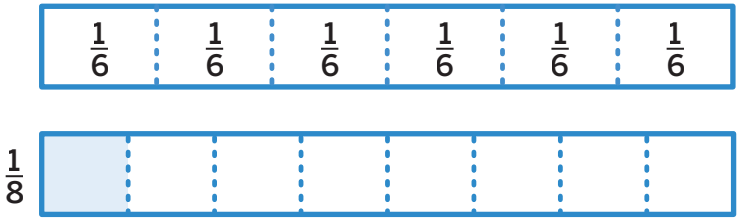
In this sub-unit . . .

- We partitioned diagrams and fraction strips into halves, thirds, fourths, **sixths**, and **eighths**. These equal parts of a whole can be represented with a number called a **fraction**.

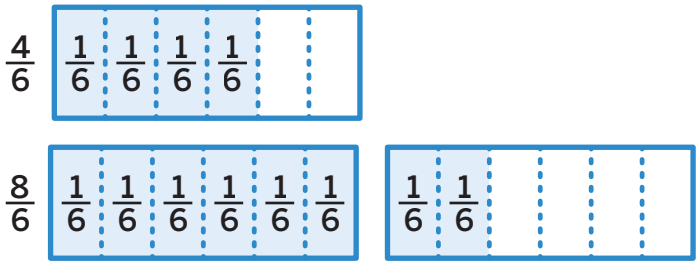


6 equal parts
6 sixths in the whole
Each part is one sixth or $\frac{1}{6}$.

- We discovered that a **unit fraction** describes 1 equal part of a whole, so each equal part can be named with a unit fraction.



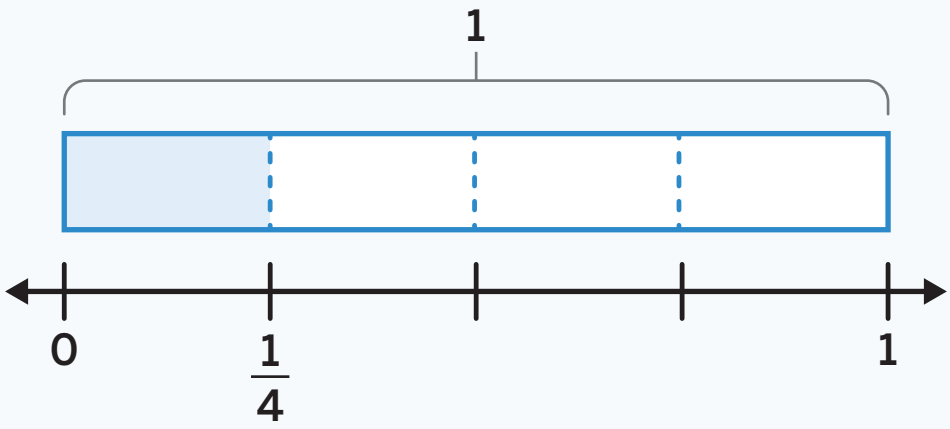
- We composed non-unit fractions from unit fractions. Non-unit fractions can describe equal parts that are less than 1 whole, equal to 1 whole, and greater than 1 whole.



Math tip: A fraction's **denominator** represents the number of equal parts in a whole. A fraction's **numerator** represents the number of equal parts being described.

Summary | Lesson 6

Fraction strips and number lines are 2 ways to represent fractions. Each equally-spaced tick mark on a number line represents a specific distance from 0.



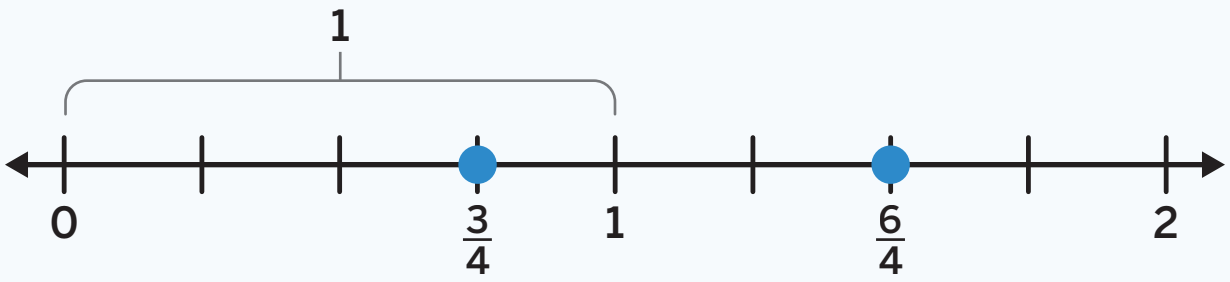
Try This

1 Refer to the fraction strip and number line shown in the Summary. How are they alike? How are they different?

2 Locate and label the fraction $\frac{1}{2}$ on the number line.

Summary | Lesson 7

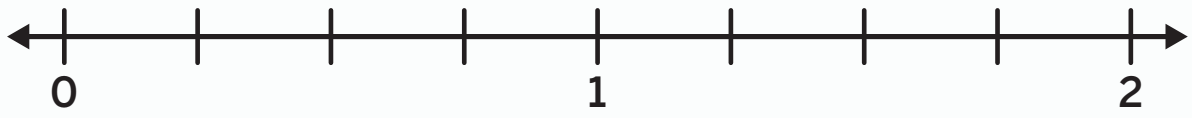
To locate fractions on a number line, equally partition the distance between whole numbers into the number of parts represented by the denominator. Then count the number of unit fractions to the right of 0 represented by the numerator.



Try This

1 Locate points *A* and *B* on the number line. Label each point with the fraction and the letter.

point *A*: $\frac{5}{4}$ point *B*: $\frac{2}{4}$

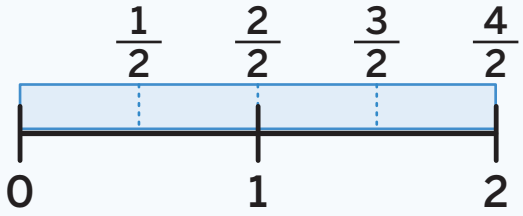


2 Locate and label the fraction on the number line.

$\frac{5}{6}$

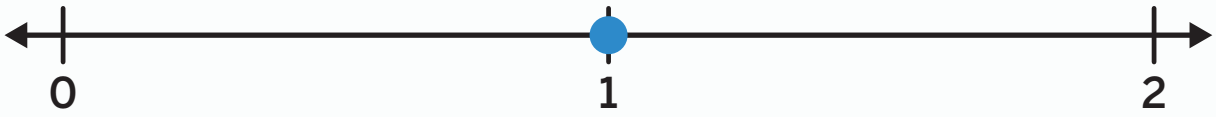
Summary | Lesson 8

Fractions at the same location as a whole number are equal to that whole number. Fractions with the same numerator and denominator are equal to 1 whole.



Try This

1 Record 2 fractions that could represent the location of the point on the number line.



_____ _____

2 Label *all* the tick marks on the number line.

Summary | Lesson 9

Reasoning about the numerator in a non-unit fraction can help you determine the location of a unit fraction. Counting by the distance between 0 and the unit fraction is helpful for locating other fractions on the number line.

Try This

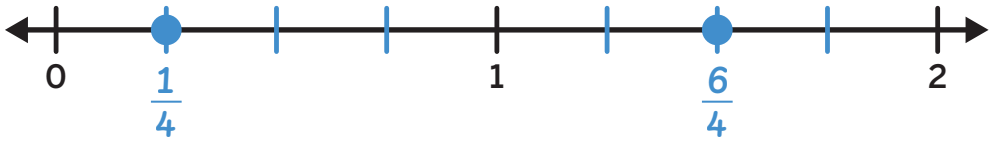
For Problems 1 and 2, the number line shows the location of 0 and a fraction. Locate the given fraction on the number line.

1 $\frac{8}{4}$

2 $\frac{7}{6}$

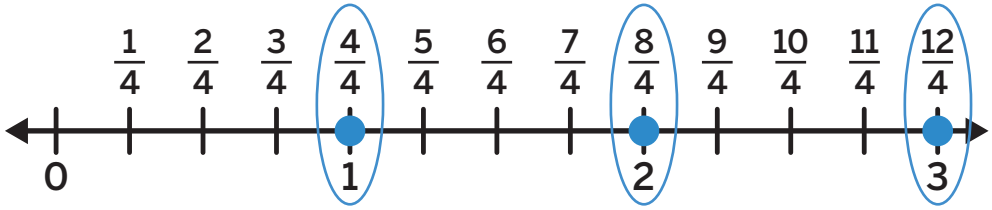
In this sub-unit . . .

- We located unit fractions and non-unit fractions on the number line by partitioning the distance between whole numbers into equal parts.

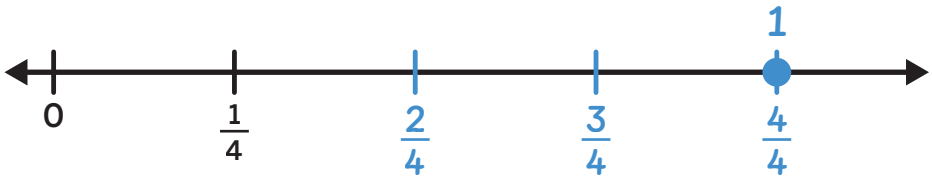


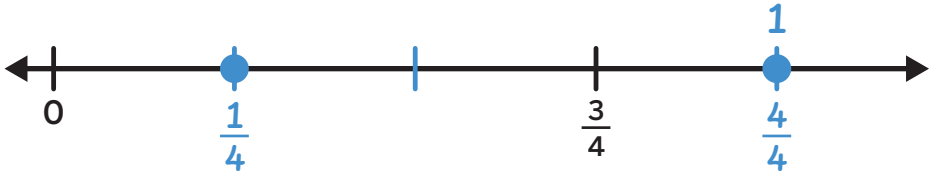
Math tip: Just like with whole numbers, the location of a fraction on the number line represents the distance from 0 to the fraction.

- We noticed that some fractions and whole numbers are located at the same place on the number line.



- We located 1 on the number line when given a unit fraction, and we located other fractions when given non-unit fractions.

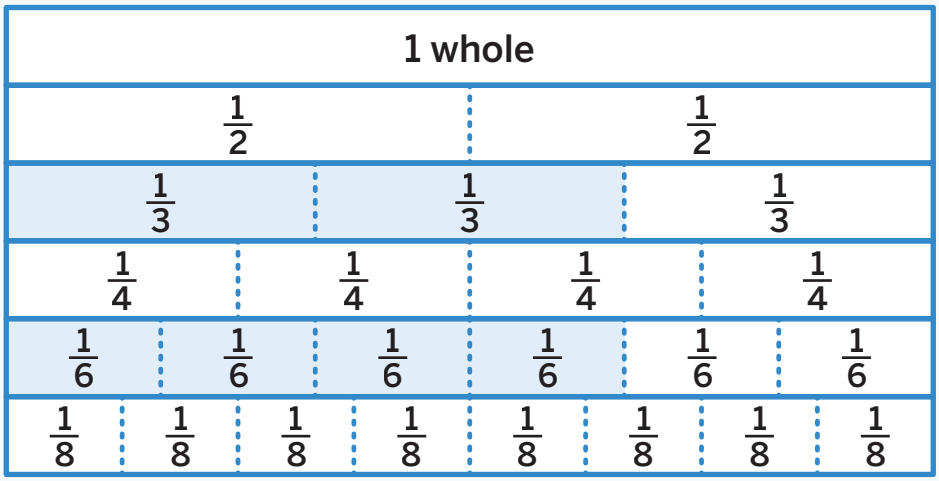




Summary | Lesson 10

When fractions represent the same value, they are **equivalent fractions**.

$$\frac{2}{3} = \frac{4}{6}$$



Try This

1 Each diagram represents 1 whole. Select the 2 diagrams in which the total shaded areas represent equivalent fractions.

(A) 

(B) 

(C) 

(D) 

2 Name the equivalent fractions from Problem 1.

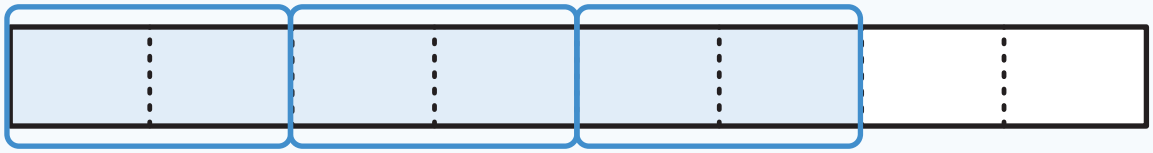
$\frac{1}{2}$ $\frac{5}{8}$ $\frac{4}{6}$ $\frac{3}{4}$ $\frac{2}{3}$ $\frac{4}{8}$

_____

Summary | Lesson 11

When using a diagram to represent 1 fraction, you can partition the diagram into smaller equal parts or combine existing parts to make larger equal parts to see and name equivalent fractions.

$$\frac{6}{8} = \frac{3}{4}$$



Try This

1 The post office is $\frac{3}{4}$ miles from the school. Clare said this distance can be represented by the fraction $\frac{6}{8}$. Shade the diagrams to represent the actual distance and Clare's distance.

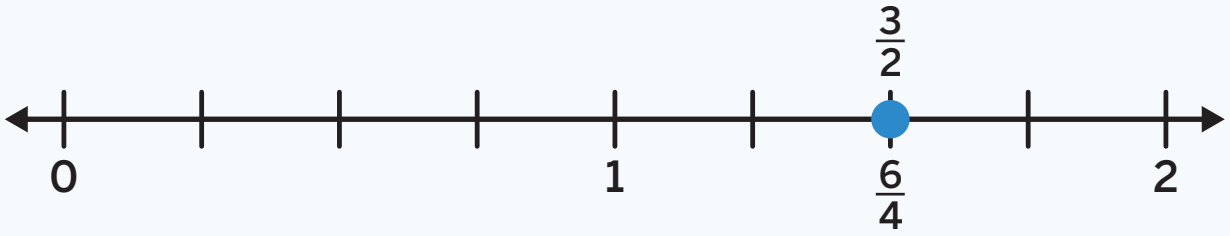
Actual

Clare's

Is Clare correct? _____

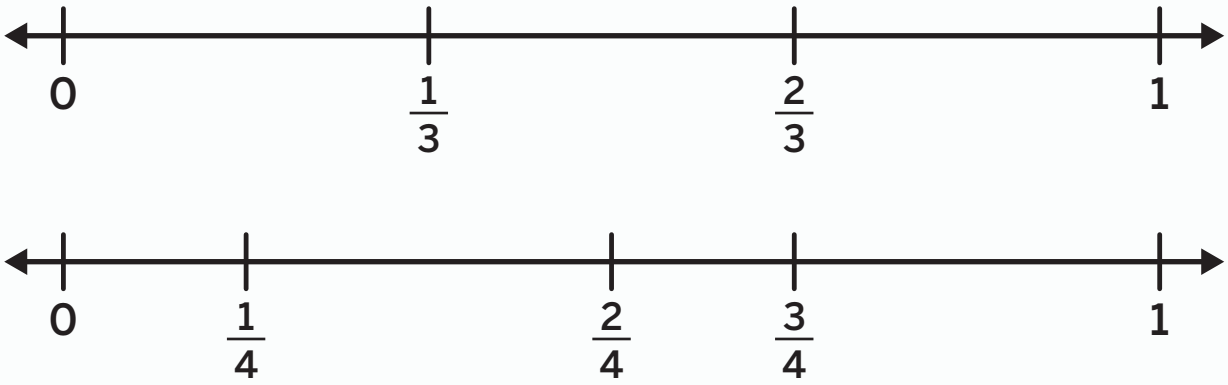
Summary | Lesson 12

2 fractions are equivalent if they are located at the same point on the number line. Number lines can also be used to find equivalent fractions by splitting or grouping parts.



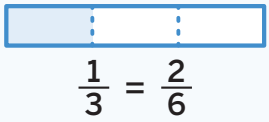
Try This

1 Shawn drew these number lines and said, "$\frac{3}{4}$ is equivalent to $\frac{2}{3}$." Explain why Shawn is *not* correct.

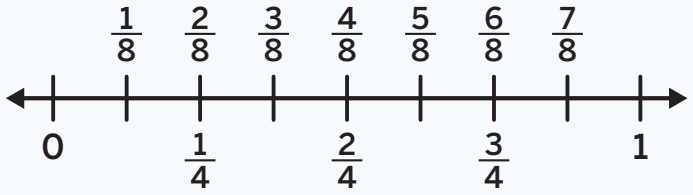


Summary | Lesson 13

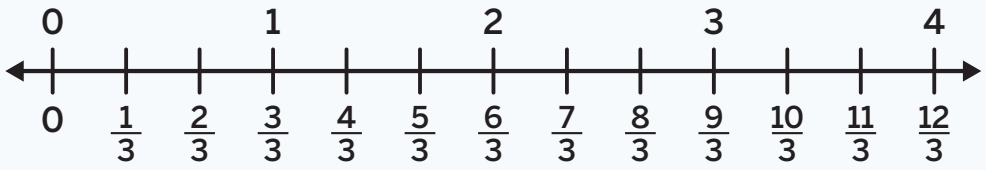
There are many ways to identify equivalent fractions and whole numbers.



$\frac{1}{3} = \frac{2}{6}$



$\frac{6}{8} = \frac{3}{4}$



$4 = \frac{12}{3}$

Try This

1 Is $\frac{12}{8}$ equivalent to a whole number? Write *yes* or *no*.

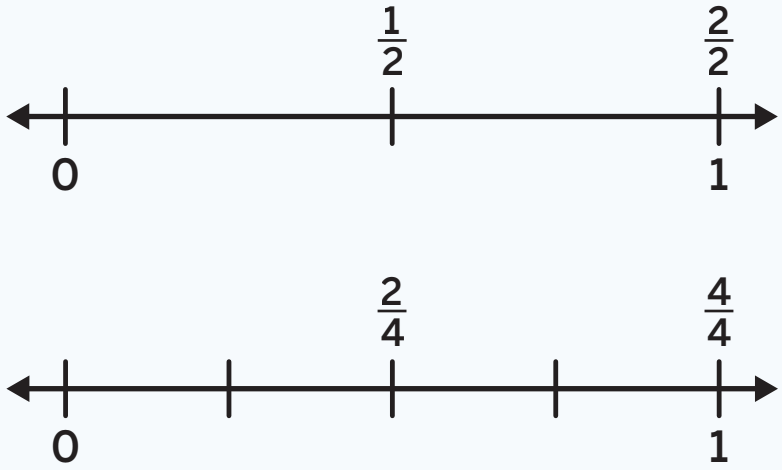
Show your thinking.

answer: _____

Summary | Lesson 14

Whole numbers can be written as fractions with a denominator of 1. When describing fractions, it is helpful to describe the numerator, denominator, and their equivalence to other numbers.

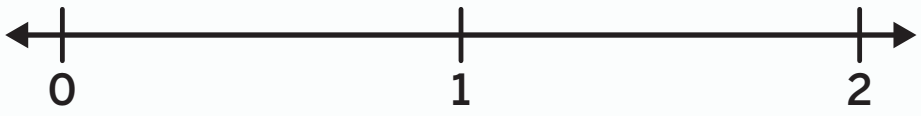
$\frac{2}{1}$ $\frac{4}{2}$ $\frac{6}{3}$ $\frac{8}{4}$



Try This

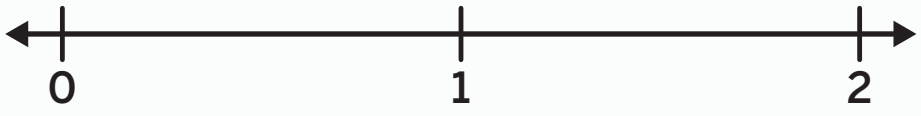
For Problems 1 and 2, partition the number line. Then use the number lines to write fractions equivalent to 2.

1 Partition the number line into halves.



2 = _____

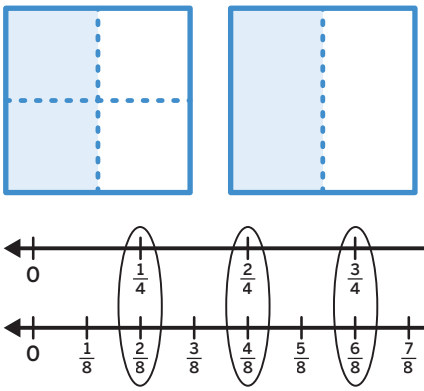
2 Partition the number line into fourths.



2 = _____

In this sub-unit . . .

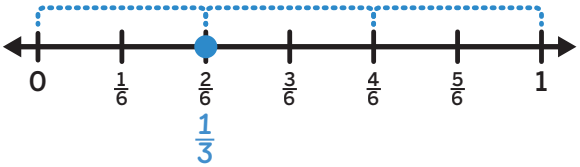
- We discovered that 2 fractions that represent the same value are called **equivalent fractions**.



- Fractions are equivalent if they represent the same area of the same-sized whole or if they are located at the same place on the number line.

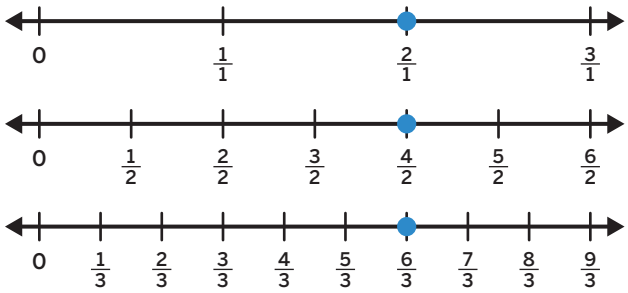
- We determined equivalent fractions by further partitioning or grouping equal parts on a fraction diagram or number line.

$\frac{3}{4}$ and $\frac{6}{8}$ are equivalent.



$\frac{2}{6}$ and $\frac{1}{3}$ are equivalent.

- We determined fractions that are equivalent to whole numbers.

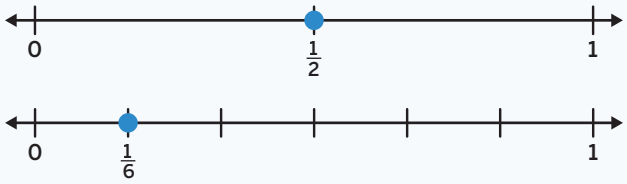


Math tip: Every whole number can be written as a fraction with a denominator of 1.

Summary | Lesson 15

Diagrams and number lines can be used to represent and compare fractions. If a whole is partitioned into more parts, each part will be smaller in size.

$$\frac{1}{2} > \frac{1}{6}$$



Try This

1 Han says that $\frac{1}{4}$ of a sandwich is larger than $\frac{1}{2}$ of the same sandwich because 4 is greater than 2. Do you *agree* or *disagree*?

Show or explain your thinking.

answer: _____

Summary | Lesson 16

Fractions with the same numerator have the same number of parts. Therefore, when comparing fractions with the same numerator, you can compare the size of the parts.

$$\frac{1}{6} < \frac{1}{4} \qquad \frac{2}{6} < \frac{2}{4} \qquad \frac{3}{6} < \frac{3}{4}$$

Try This

1 Clare was given the statement $\frac{2}{3} > \frac{2}{?}$ and the numbers 2, 3, 4, 6, and 8 to use as denominators. She said that only 6 and 8 would make the statement true. Do you agree with Clare? Write *yes* or *no*.

Show or explain your thinking.

answer: _____

Summary | Lesson 17

When comparing fractions with the same denominator, the size of the parts is the same. A fraction with a greater numerator is greater than a fraction with the same denominator and a lesser numerator.

$$\frac{5}{8} > \frac{3}{8} \qquad \frac{4}{6} > \frac{2}{6} \qquad \frac{1}{4} < \frac{3}{4}$$

Try This

For Problems 1 and 2, write a numerator or denominator to make the statement true.

1 $\frac{5}{4} < \frac{\square}{4}$

2 $\frac{3}{8} < \frac{3}{\square}$

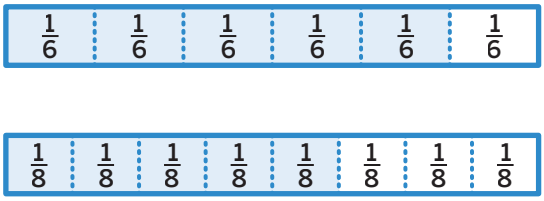
For Problems 3 and 4, use <, >, or = to make the statement true.

3 $\frac{5}{6}$ _____ $\frac{2}{6}$

4 $\frac{4}{3}$ _____ $\frac{8}{3}$

In this sub-unit . . .

- We reasoned about the size of each equal part to compare unit fractions and other fractions with the *same numerator*. We used the < and > symbols to record comparisons.

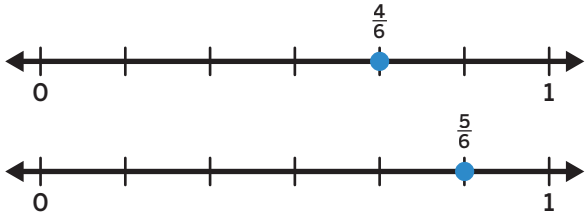


$\frac{5}{6} > \frac{5}{8}$

5 sixths is greater than 5 eighths because sixths are bigger than eighths.

Math tip: The greater the denominator, the smaller the equal parts.

- We reasoned about the number of same-sized parts to compare fractions with the *same denominator*.



$\frac{4}{6} < \frac{5}{6}$

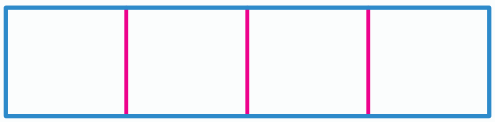
Both fractions represent the same-sized parts. 4 is less than 5, so 4 sixths is less than 5 sixths.

Math tip: The greater the numerator, the more equal parts there are.

Lesson 2

Sample responses:

1



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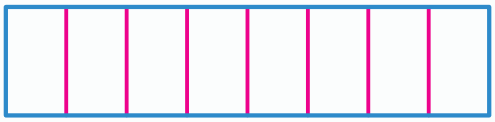


Lesson 3

1 Sample explanation:

$\frac{1}{3}$; The rectangle is partitioned into 3 equal parts, so each part is $\frac{1}{3}$.

Lesson 4

1 Sample explanation:

Diego; Each rectangle is partitioned into sixths. Ten sixths are shaded, so $\frac{10}{6}$ represents the diagram

Lesson 5

1 Sample response:

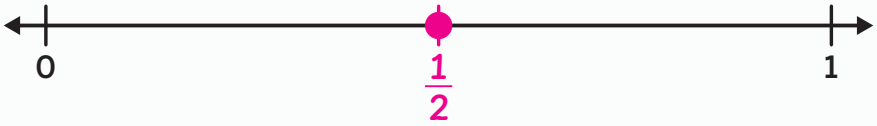
I partitioned the strip into fourths and then I shaded 3 of the 4 fourths.

Lesson 6

1 Sample response:

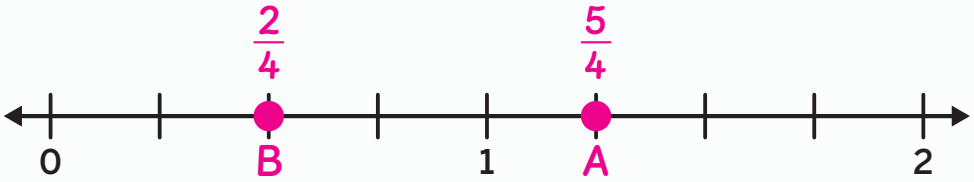
They both show fourths and are split into equal parts. The number line has 0 and 1. The number line has tick marks instead of partitions.

2 Sample work:

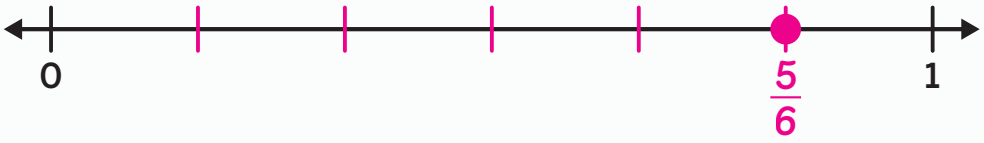


Lesson 7

1



2 Sample work:

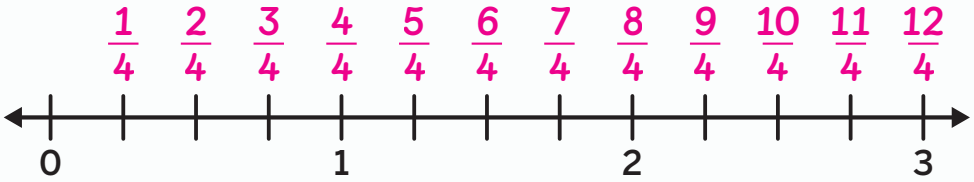


Lesson 8

1 Sample response:

$\frac{3}{3}, \frac{2}{2}$

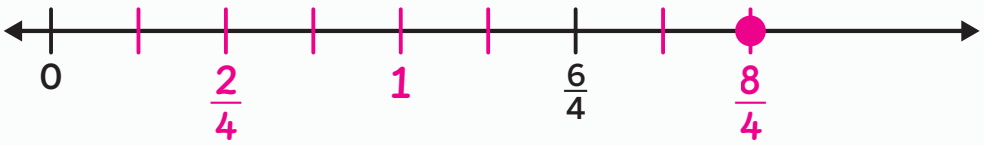
2



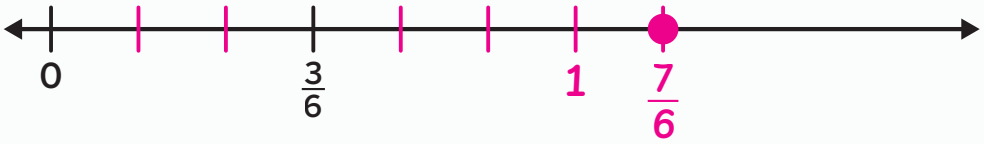
Lesson 9

Sample work:

1



2



Lesson 10

1 A, D

2 $\frac{1}{2}$ and $\frac{4}{8}$

Try This | Answer Key

Lesson 11

1

Actual 

Clare's 

Is Clare correct? yes

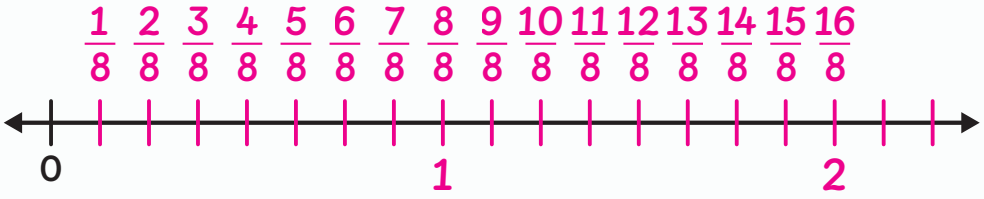
Lesson 12

1 Sample response:

The fourths on the bottom number line are not equally spaced apart.

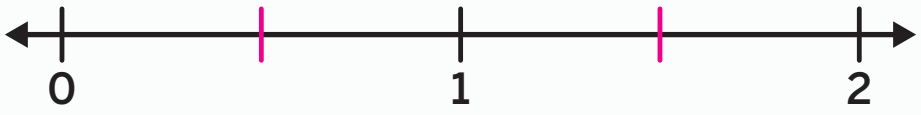
Lesson 13

1 Sample work:

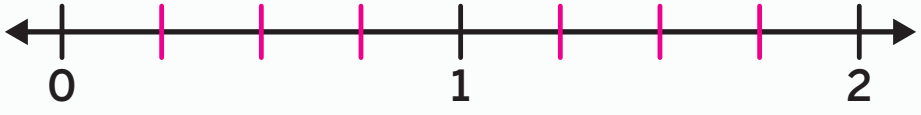


answer: no

Lesson 14

1 

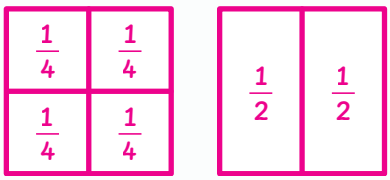
2 = $\frac{4}{2}$

2 

2 = $\frac{8}{4}$

Lesson 15

1 Sample work:

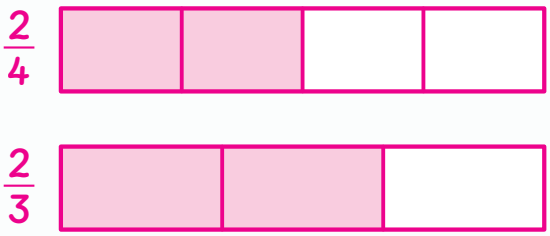


$\frac{1}{4}$ of a sandwich is smaller than $\frac{1}{2}$ of the sandwich.

answer: disagree

Lesson 16

1 Sample work:



$\frac{2}{3}$ is greater than $\frac{2}{4}$. So, 4 could also be a denominator.

answer: no

Lesson 17

1 $\frac{6}{4}$ Other possible responses: Any whole number greater than 5

2 $\frac{3}{4}$ Other possible responses: 1, 2, 3, 5, 6, 7

3 >

4 <